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We Claim:

1. A method of removing metallic mercury and ionic mercury from flue gases, said method including steps of:

conveying a gas that contains sulfur dioxide, or other adequate amounts of sulfur in the form of H_2S or COS , and a gas that contains hydrogen, to a catalyzer for producing a gas G that contains elemental sulfur and hydrogen sulfite; and

conveying said gas G to flue gas upstream of a separator, wherein mercury in said flue gas reacts with elemental sulfur and ionic sulfur in said gas G and is separated out in said separator.

2. A method according to claim 1, wherein said gas that contains sulfur dioxide is selected from at least one of the group consisting of sulfur dioxide from a supply of SO_2 , a sulfur dioxide containing gas from the combustion of elemental sulfur or from the thermal treatment of sulfur-containing material, and a partial stream of said flue gas.

3. A method according to claim 2, wherein said thermal treatment of sulfur-containing material comprises the roasting of pyrite.

4. A method according to claim 1, wherein said gas that contains other adequate amounts of sulfur is at least a synthesis gas from coal gasification.

5. A method according to claim 1, wherein said gas that contains hydrogen is at least one of a gas selected from the group consisting of hydrogen, natural gas and synthesis gas from gasification of coal.

5 6. A method according to claim 1, wherein where at least one of said gases that contain sulfur dioxide ^{or} and hydrogen also contains dust, ^{or} said gas is subjected to a removal of dust prior to conveying said gas to said catalyzer.

10 7. A method according to claim 1, wherein at least one of said gases that is conveyed to said catalyzer is heated up or cooled off.

8. A method according to claim 1, wherein said gas that is produced in said catalyzer is heated up or cooled off to a temperature that is suitable for a mixing of said gas with said flue gas.

15 9. A method according to claim 7, wherein said heating up or cooling off is effected via a gas/gas heat exchanger.

10. A method according to claim 8, wherein said heating up or cooling off is effected via a gas/gas heat exchanger.

20 11. A method according to claim 1, wherein air for combustion for a power plant is heated up by said flue gas in an air preheater, and wherein said gas produced in said catalyzer is conveyed to said flue gas upstream or downstream of said air preheater.

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12. A method according to claim 1, wherein said separator is selected from the group consisting of electrostatic filters, fibrous filters, spray dryers and absorption scrubbers.

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